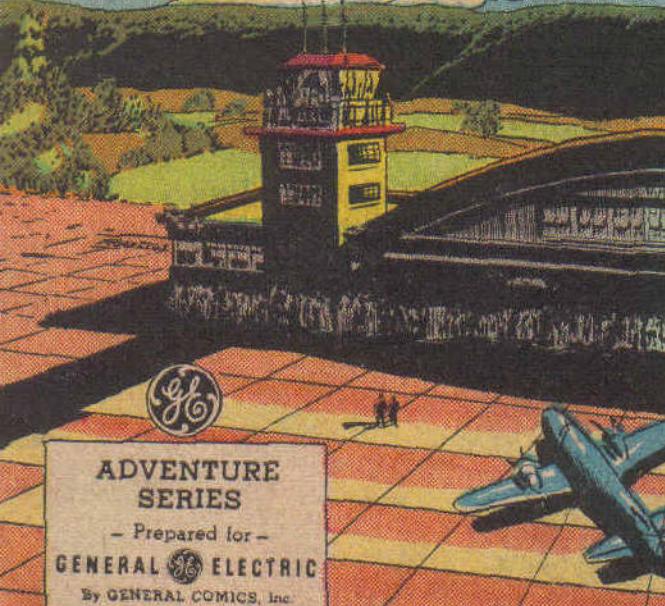
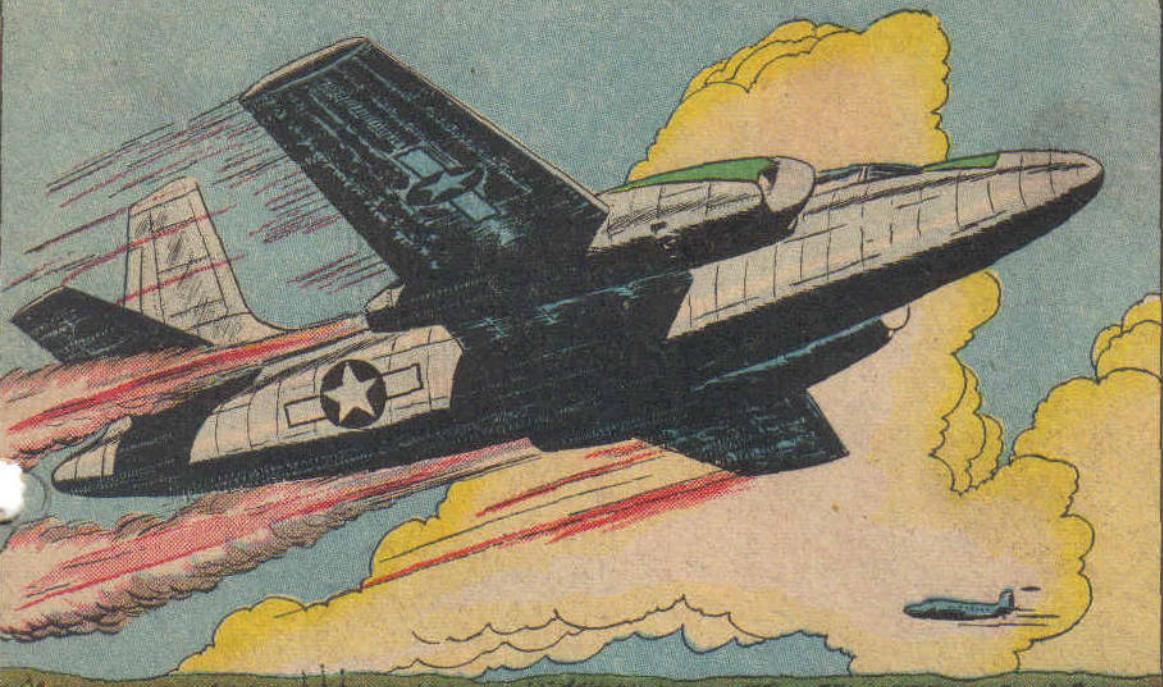


ADVENTURES IN JET POWER



GET PROPULSION--AN IDEA CENTURIES OLD--WAS DEVELOPED ONLY IN THE STRESS AND STRUGGLE OF A MODERN WAR-TIME EMERGENCY. TODAY, PLANES POWERED BY JET ENGINES CARRY MEN THROUGH THE AIR FASTER THAN EVER BEFORE. PROMISE EVEN GREATER SPEED AND POWER FOR THE FUTURE.

YOU'LL FIND AGAIN THAT FACTS CAN BE MORE THRILLING THAN FICTION IN THE TRUE STORY BEHIND--

**SUPER-SPEED
JET AIRCRAFT**

WEB COMIC UNIVERSE.COM



AS A JET PLANE--NORTH AMERICAN'S B-45 TORNADO--FLASHES PAST JOHNNY POWERS AND HIS SCIENTIST BROTHER, ED...

ZING! NO WONDER THEY CALL IT A TORNADO--IT SURE MOVES LIKE ONE!

YES--AND IT'S POWERED BY ONE, TOO, JOHNNY.

BEAUTIFUL SIGHT, ISN'T IT? BUT WHAT A WHALE OF A LOT OF TROUBLE WE HAD BEFORE WE FINALLY MADE JET PROPULSION WORK!

WHAT DO YOU MEAN "FINALLY?" YOU TALK AS THOUGH THE IDEA WAS A THOUSAND YEARS OLD.

ACTUALLY ALMOST TWO THOUSAND, JOHNNY. BUT IT WAS ONLY A DREAM FOR MANY CENTURIES. THE STORY OF THE MEN WHO MADE THAT DREAM A REALITY BEGAN IN 1933...

CONTINUE HIS RESEARCH ON A 'PROPELLERLESS AIRCRAFT'."

LOOKS LIKE A FLIGHT OF THE IMAGINATION TO ME, OLD CHAP.

I TELL YOU IT CAN BE DONE. AND SOMEDAY I'LL FIND A MANUFACTURER WITH ENOUGH VISION TO HAVE A GO AT MY JET PLANE.

YEAR AFTER YEAR, THE YOUNG INVENTOR STRUGGLED TO PERFECT HIS ENGINE. AND THEN CAME WAR AND THE DEVELOPMENT OF JET POWER BECAME URGENT!"

STILL HAVING TROUBLE?

IM CERTAIN I'M ON THE RIGHT TRACK, SIR; BUT IT WILL TAKE TIME.

NOT TOO MUCH, I HOPE. YOUR WORK IS A VITAL PART OF THE WAR EFFORT. YOU MUST SUCCEED!

"IN THE SUMMER OF 1941,
NAZI BOMBERS SWARMED OVER
ENGLAND. GALLANT RAF FLIERS,
PILOTING SPITFIRES, FOUGHT
THE RUTHLESS ENEMY IN THE
SKIES WHILE LONDON BURNED
BELOW..."



"WHILE THE DESPERATE BATTLE WAS GOING ON..."

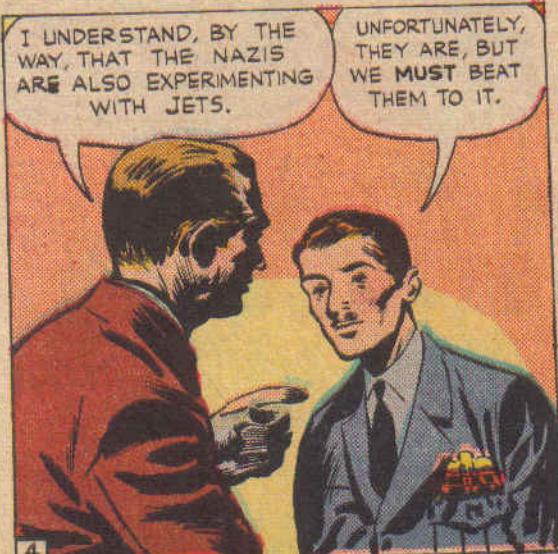
AH, HERE'S THE
AMERICAN ENGINEER
NOW...

BEG PARDON, SIR...A
CABLEGRAM FOR YOU. I BELIEVE
IT'S URGENT!

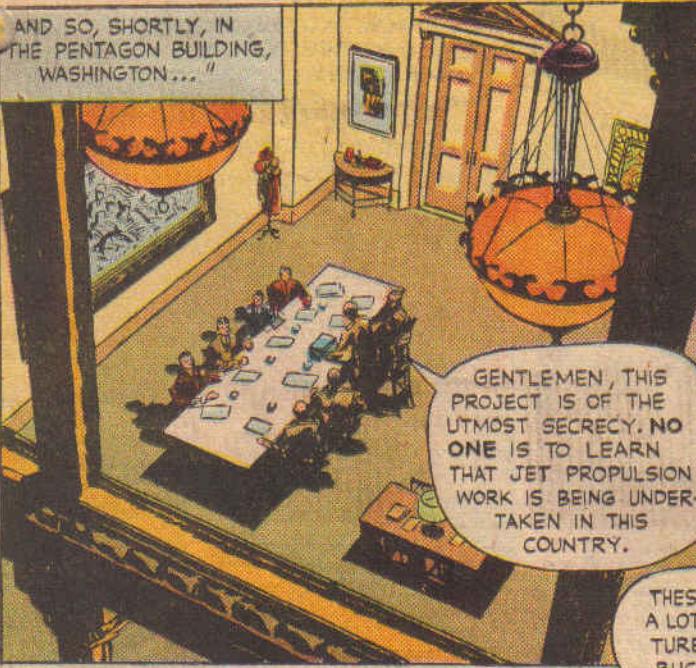


HMM...FROM THE BIG BOSS AT HOME.
INSTRUCTIONS TO REPORT TO A LONDON
ADDRESS FOR FURTHER ORDERS. NO
EXPLANATION, NO DETAILS—SOUNDS
MYSTERIOUS!





AND SO, SHORTLY, IN
THE PENTAGON BUILDING,
WASHINGTON..."



GENTLEMEN, THIS
PROJECT IS OF THE
UTMOST SECRECY. NO
ONE IS TO LEARN
THAT JET PROPULSION
WORK IS BEING UNDERTAKEN
IN THIS COUNTRY.



THESE PAPERS HAVE
JUST ARRIVED BY ARMY
PLANE FROM ENGLAND. I
HAVEN'T SEEN THEM
MYSELF, YET.

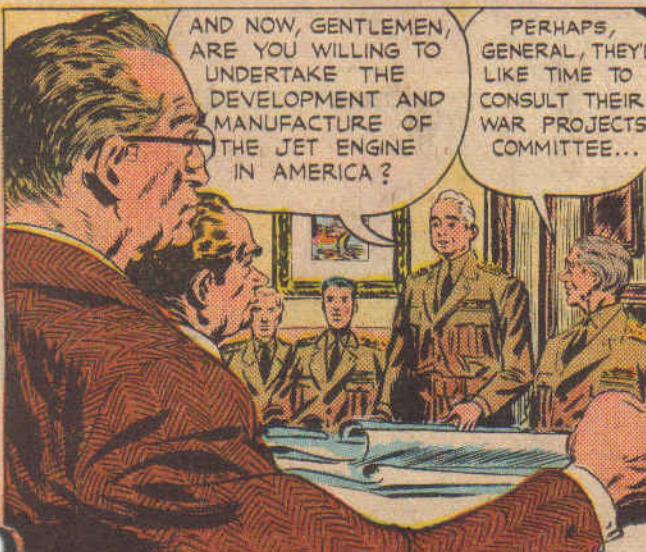


HERE YOU ARE... VERY ROUGH, BUT
THEY'LL GIVE YOU THE IDEA. THIS
IS THE BRITISH JET ENGINE.



THESE ARE
A LOT LIKE
TURBINE
BUCKETS!

EXACTLY! THAT'S WHY WE'VE COME
TO YOUR COMPANY FOR HELP, OF COURSE.
YOU PEOPLE ARE PRIMARILY CONCERNED
WITH ELECTRICITY, BUT WE NEED THE
BENEFIT OF YOUR EXPERIENCE
WITH THE STEAM
TURBINE AND
SUPERCHARGER.



AND NOW, GENTLEMEN,
ARE YOU WILLING TO
UNDERTAKE THE
DEVELOPMENT AND
MANUFACTURE OF
THE JET ENGINE
IN AMERICA?

PERHAPS,
GENERAL, THEY'D
LIKE TIME TO
CONSULT THEIR
WAR PROJECTS
COMMITTEE...



THAT ISN'T NECESSARY,
SIR... GENERAL ELECTRIC
WILL TAKE ON THE JOB
RIGHT NOW!

"AND SO, THE UNITED STATES JOINED
BRITAIN AGAINST GERMANY IN THE
RACE TO BUILD A FASTER PLANE --
A JET PLANE!"

"SOON, IN THE G-E PLANT AT LYNN, FIVE KEY ENGINEERS ARE PULLED OFF TURBOSUPERCHARGER WORK...."

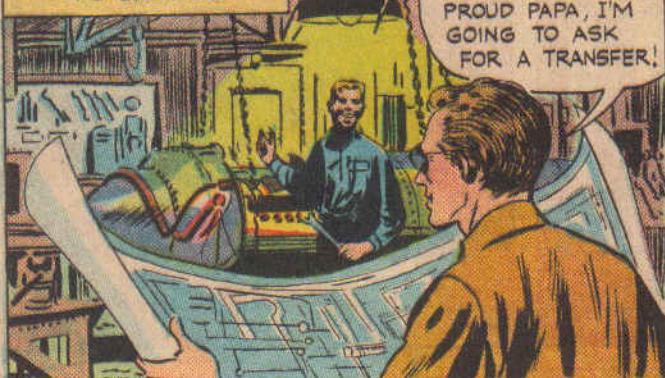
"...SO YOU SEE, MEN, WE'VE TAKEN ON QUITE A CHALLENGE—AN ARMY AIR FORCES TOP SECRET... AND WE'VE GOT TO KEEP IT A SECRET! ANY QUESTIONS?"



"THOSE MEN REALLY DID GET BUSY, TOO. IN JUST A FEW WEEKS THEY HAD COMPLETED DESIGNS FOR SEVERAL DIFFERENT PARTS OF THE ENGINE..."

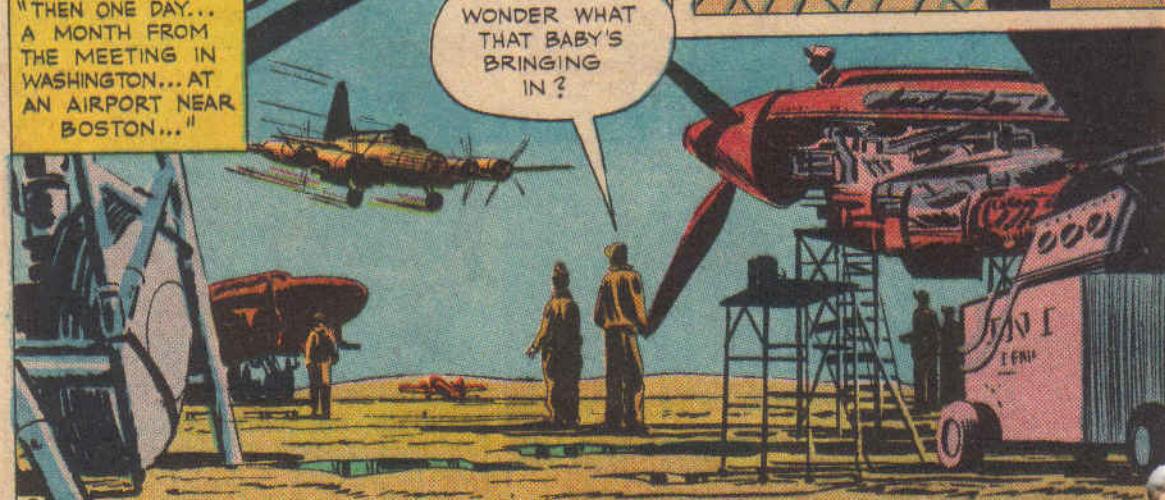
"JUST LOOK AT HER, TOM! ISN'T SHE BEAUTIFUL?"

"SO HELP ME, IF YOU DON'T STOP ACTING LIKE A PROUD PAPA, I'M GOING TO ASK FOR A TRANSFER!"



"THEN ONE DAY... A MONTH FROM THE MEETING IN WASHINGTON... AT AN AIRPORT NEAR BOSTON..."

"WONDER WHAT THAT BABY'S BRINGING IN?"



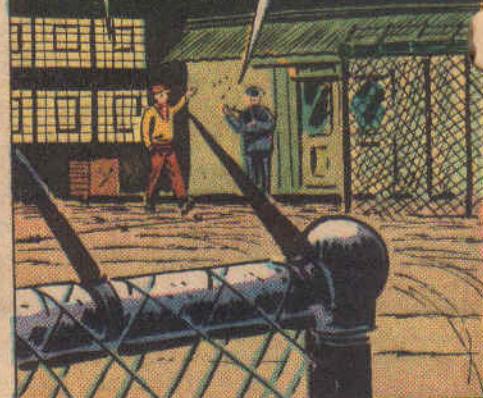
"RIGHT NOW! YOU FELLOWS ARE TO BEGIN COLLECTING MEN FOR THE DIFFERENT UNITS IMMEDIATELY. THE BRITISH ENGINE WILL ARRIVE IN A FEW WEEKS, AND WE'VE A LOT TO DO IN THE MEANTIME. SO GET BUSY... AND GOOD LUCK!"

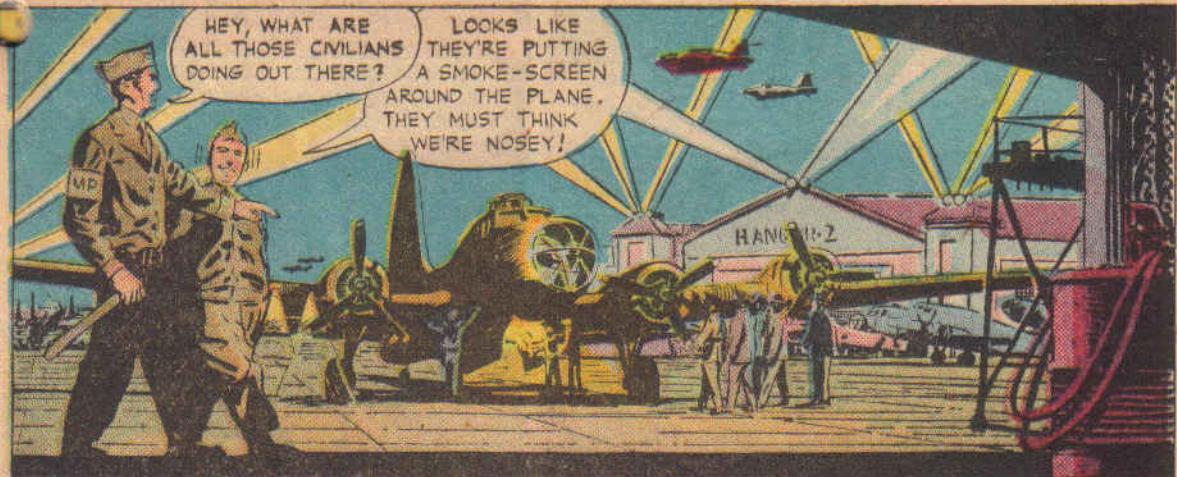


"WHILE OUTSIDE..."

"HI, FRANK... WHAT HAPPENS INSIDE?"

"SAY... YOU KNOW BETTER THAN TO ASK QUESTIONS LIKE THAT! IF THEY WANTED YOU TO KNOW, THEY WOULDN'T HAVE ME STANDING HERE!"





"THE NEXT SIX MONTHS WERE BUSY ONES AT G.E.--
AND VIGILANCE WASN'T RELAXED FOR A MOMENT."

I DON'T LIKE THIS PRYING
INTO THE PRIVATE LIVES OF
OUR EMPLOYEES...

I UNDERSTAND, SIR...
BUT WE'VE GOT TO WEED
OUT THE "TALKERS."



"ONLY RELIABLE MEN, FROM WORKS MANAGER
TO JANITORS, WERE CHOSEN..."

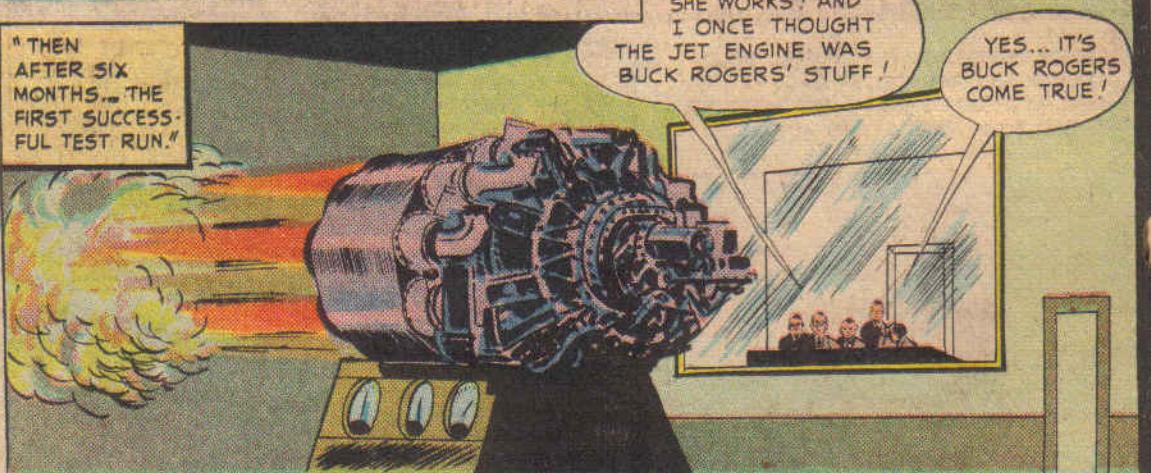
IT ISN'T THAT I'M NOT INTERESTED
IN MY HUSBAND'S WORK... HE JUST
WON'T TALK ABOUT IT!



"THEN
AFTER SIX
MONTHS... THE
FIRST SUCCESS-
FUL TEST RUN."

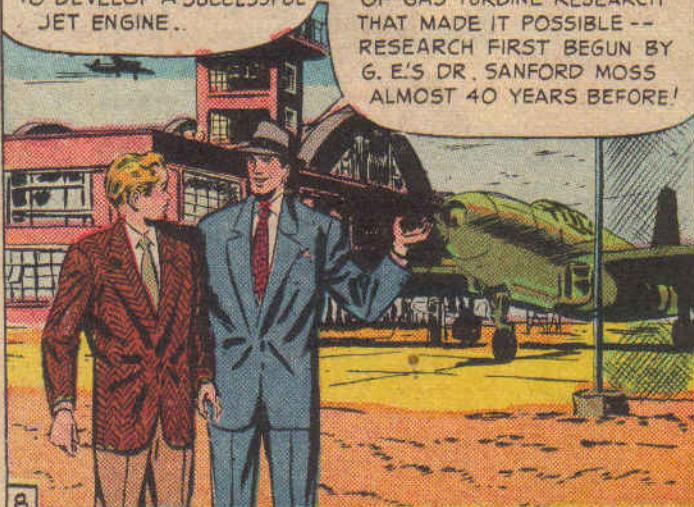
SHE WORKS! AND
I ONCE THOUGHT
THE JET ENGINE WAS
BUCK ROGERS' STUFF!

YES... IT'S
BUCK ROGERS
COME TRUE!



IT TOOK G.E. ONLY SIX
MONTHS, SINCE THAT
MEETING IN WASHINGTON,
TO DEVELOP A SUCCESSFUL
JET ENGINE...

...BUT THAT'S NOT
COUNTING THE MANY YEARS
OF GAS TURBINE RESEARCH
THAT MADE IT POSSIBLE--
RESEARCH FIRST BEGUN BY
G.E.'S DR. SANFORD MOSS
ALMOST 40 YEARS BEFORE!



BUT, ED-- YOU SAID
BEFORE THAT THE IDEA
OF JET PROPULSION
WAS 2,000 YEARS
OLD! WHY, PEOPLE IN
THOSE DAYS DIDN'T
KNOW ANYTHING
ABOUT ELECTRICITY--
OR STEAM...

HMM... YOU'RE
NOT GIVING
THOSE OLD
BOYS ENOUGH
CREDIT,
JOHNNY. FACT
IS, THEY
DID KNOW
SOMETHING
ABOUT STEAM
AND HOW TO GET
POWER FROM IT.



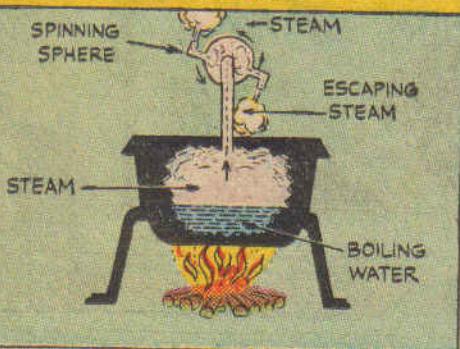
"IN 100 A.D., HERO OF ALEXANDRIA INVENTED THE FIRST STEAM TURBINE."

IT SPINS BY ITSELF...
'TIS MAGIC!

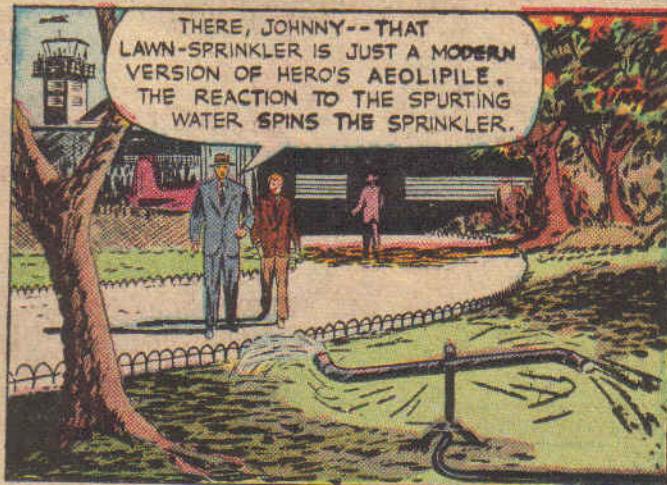
AYE, THE
MAGIC OF
MY MIGHTY
BRAIN!



"STEAM FORMED IN THE VESSEL BELOW PASSED INTO THE HOLLOW BALL AT TOP. AS IT ESCAPED THROUGH THE NOZZLES IN THE BALL, THE STEAM JET MADE THE BALL SPIN."



THERE, JOHNNY-- THAT LAWN-SPRINKLER IS JUST A MODERN VERSION OF HERO'S AEOLIPILE. THE REACTION TO THE SPURTING WATER SPINS THE SPRINKLER.



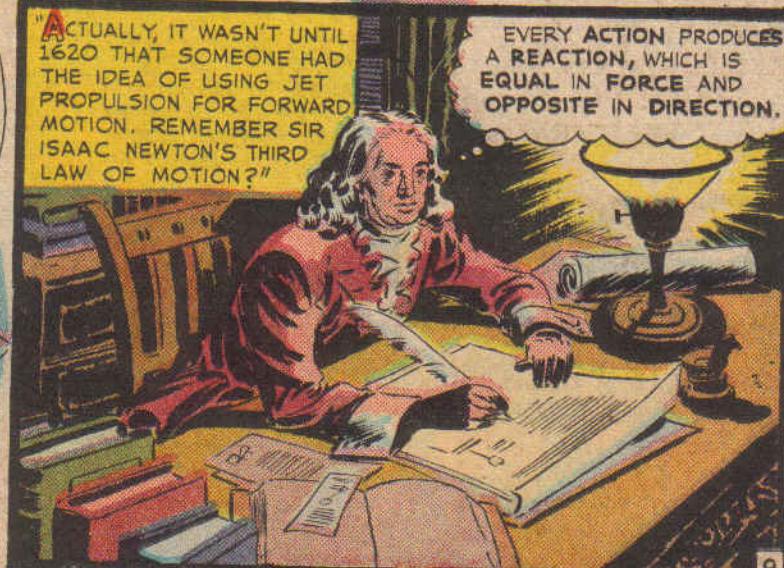
BUT THAT SPRINKLER DOESN'T GO ANY PLACE. THAT'S A LONG WAY FROM A 600-MILE-AN-HOUR JET PLANE.

THAT'S RIGHT, JOHNNY. BUT IT'S BASED ON THE SAME IDEA.



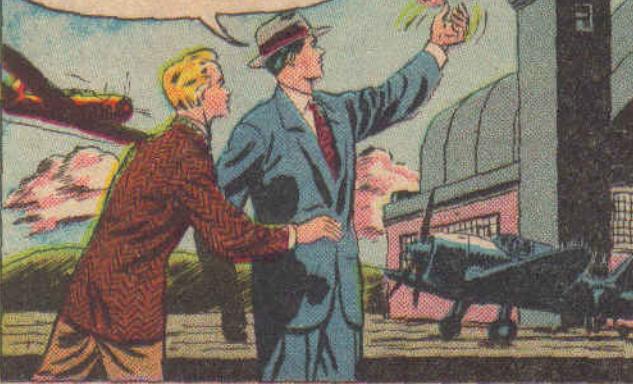
"ACTUALLY, IT WASN'T UNTIL 1620 THAT SOMEONE HAD THE IDEA OF USING JET PROPULSION FOR FORWARD MOTION. REMEMBER SIR ISAAC NEWTON'S THIRD LAW OF MOTION?"

EVERY ACTION PRODUCES A REACTION, WHICH IS EQUAL IN FORCE AND OPPOSITE IN DIRECTION.

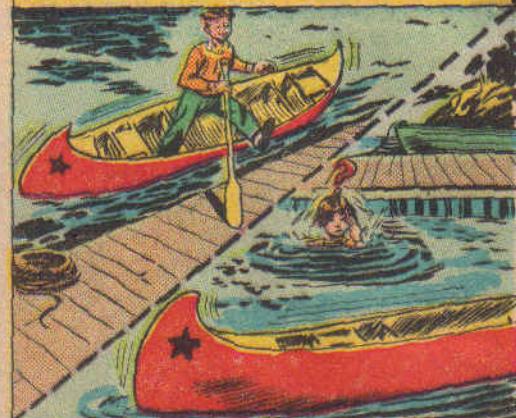


"THE IDEA'S SIMPLE, JOHNNY. BLOW UP A BALLOON LIKE THIS ONE... AND WHEN YOU LET IT GO..."

THE AIR SHOOTS OUT IN ONE DIRECTION THROUGH THE OPENING... AND THE REACTION PUSHES THE BALLOON IN THE OPPOSITE DIRECTION.

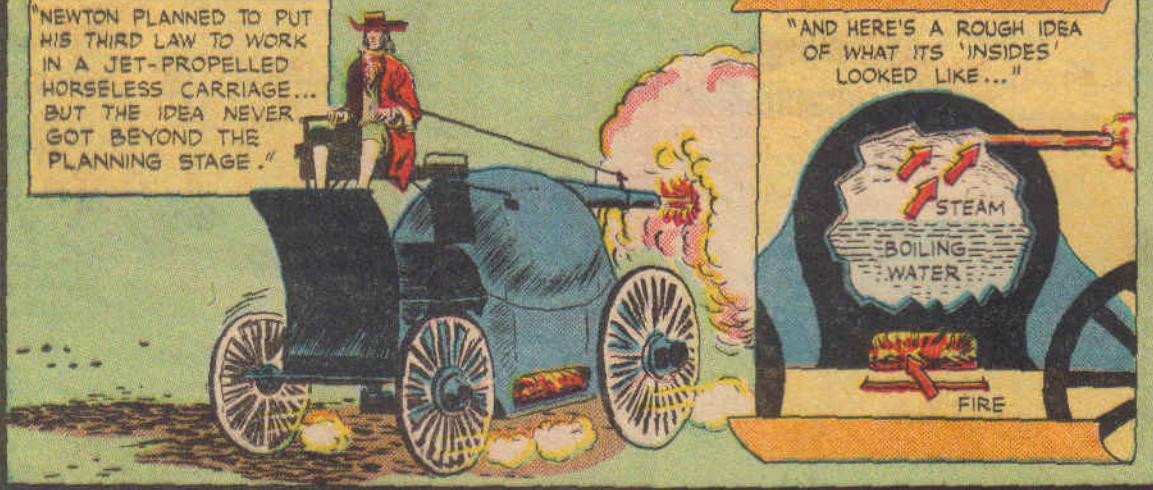


"OR TAKE A BOY STEPPING OUT OF A CANOE..."

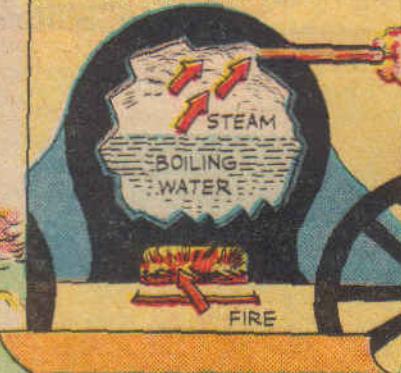


"AS HE THRUSTS HIS FOOT FORWARD, THE CANOE SHOOTS BACK."

"NEWTON PLANNED TO PUT HIS THIRD LAW TO WORK IN A JET-PROPELLED HORSELESS CARRIAGE... BUT THE IDEA NEVER GOT BEYOND THE PLANNING STAGE."



"AND HERE'S A ROUGH IDEA OF WHAT ITS 'INSIDES' LOOKED LIKE..."



SURE, I GET IT... BUT A MODERN JET ENGINE DOESN'T GET ITS POWER FROM STEAM PRESSURE, DOES IT?

NO, JOHNNY. TODAY, JETS GET THEIR POWER FROM THE HOT EXPANDING GASES PRODUCED BY THE CONTINUOUS BURNING FUEL. GET IT?

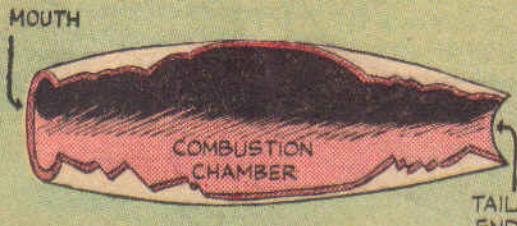


I-I GUESS SO... BUT...

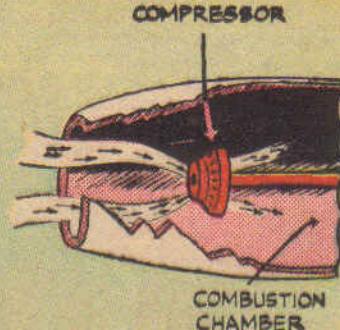
TELL YOU WHAT, JOHNNY... I'LL DRAW A PICTURE FOR YOU...



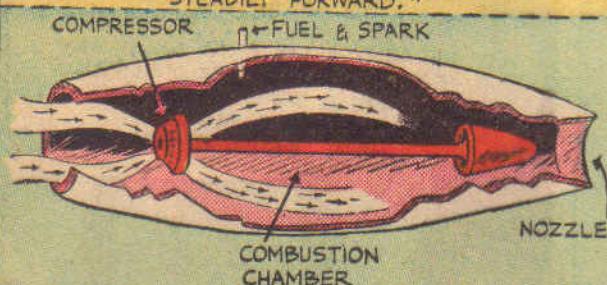
"FIRST, WE'LL START WITH THE SHELL OF THE WHOLE ENGINE... PRACTICALLY A BIG COMBUSTION CHAMBER."



"INSIDE THE MOUTH IS A ROTATING FAN OR COMPRESSOR, WHICH SUCKS IN AIR, PACKS IT TIGHT AND FORCES IT BACKWARDS INTO THE COMBUSTION CHAMBER..."



"IN THE COMBUSTION CHAMBER, FUEL IS MIXED WITH THIS COMPRESSED AIR AND BURNED. THIS COMBUSTION CREATES HOT, EXPANDING GASES WHICH BLAST OUT THROUGH THE NOZZLE AT THE TAIL-END WITH TERRIFIC FORCE. REACTION TO THIS STEADY JET PROPELS THE PLANE STEADILY FORWARD."

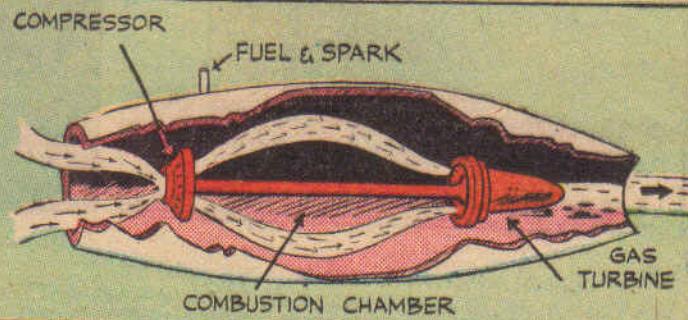


SURE... NEWTON'S THEORY. BUT WHAT TURNS THE COMPRESSOR?

THAT, JOHNNY, WAS ONE OF OUR PROBLEMS.



"YOU SEE, A GAS TURBINE IS ADDED AT THE REAR OF THE COMBUSTION CHAMBER. AS THE HOT GASES RUSH THROUGH, THEY PUSH PAST THE BLADES OF THIS TURBINE, TURNING THEM AS THE WIND TURNS A WINDMILL. THAT SPINNING TURBINE OPERATES THE COMPRESSOR THROUGH A DIRECT SHAFT."



I GET IT! IT'S ALMOST LIKE PERPETUAL MOTION.

NOT REALLY, JOHNNY. REMEMBER, FUEL HAS TO BE ADDED CONSTANTLY.



AND HERE'S THE WAY A MODERN ENGINE--THE G.E. TURBOJET ACTUALLY LOOKS...



"IT HAS MANY COMBUSTION CHAMBERS--BUT IT OPERATES ON THE SAME PRINCIPLE."

WOW! YOUR EXPLANATION WAS SIMPLE, ED, BUT THE REAL ENGINE LOOKS AWFULLY COMPLICATED!

YES, JOHNNY, BUT THAT JET ENGINE HAS JUST THOSE SAME BASIC PARTS- COMPRESSOR, COMBUSTION CHAMBERS, TURBINE AND NOZZLE. SIMPLE, COMPARED TO THE 11,000 PARTS IN A PISTON ENGINE!

OH, YES, JOHNNY-- ANOTHER PROBLEM WAS TO DEVELOP HEAT-RESISTANT METAL ALLOYS THAT COULD STAND THE SCORCHING 2000-DEGREE HEAT INSIDE THE ENGINE! ALSO--

--FOR USE ON AIRPLANES, THESE ALLOYS HAD TO BE LIGHTWEIGHT-- YET STRONG ENOUGH TO STAND THE TERRIBLE STRESSES!

BOY! THAT'S A LOT TO EXPECT FROM METAL!

IT CERTAINLY IS-- BUT G. E. HAD GAINED A LOT OF KNOWLEDGE FROM ITS LONG YEARS OF GAS TURBINE AND METALS RESEARCH...

-- AND THAT'S WHY THE ARMY AIR FORCES HANDED THEM THE JOB!

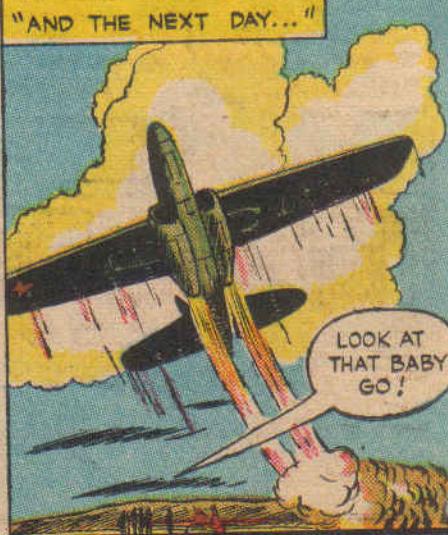
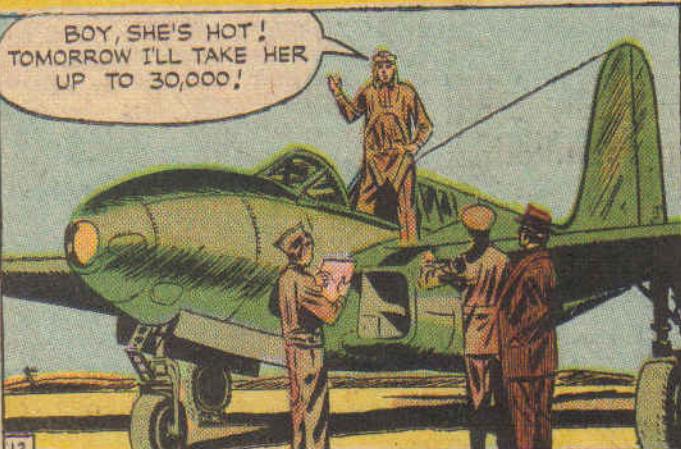
RIGHT, JOHNNY! BUT TO GET ON WITH THE STORY-- THE FIRST AMERICAN JET ENGINE REALLY WORKED-- ON THE TEST-BLOCK. BUT WOULD IT FLY A PLANE?

THE ANSWER CAME IN OCTOBER, 1942, AT MUROC, CALIFORNIA. AN EXPERIMENTAL P-59 BELL AIRACOMET WAS READY FOR ITS FLIGHT TESTS...

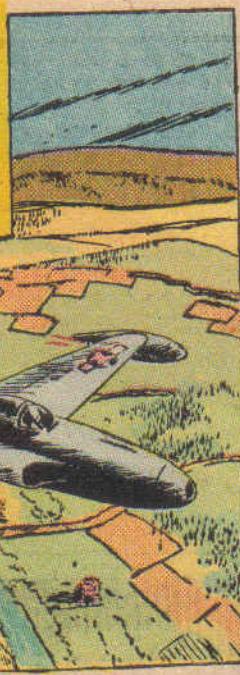
BOY, SHE'S HOT! TOMORROW I'LL TAKE HER UP TO 30,000!

AND THE NEXT DAY...

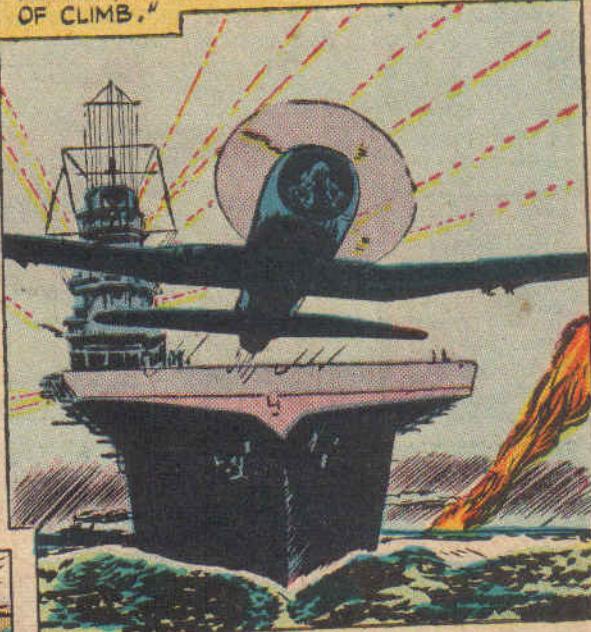
LOOK AT THAT BABY GO!



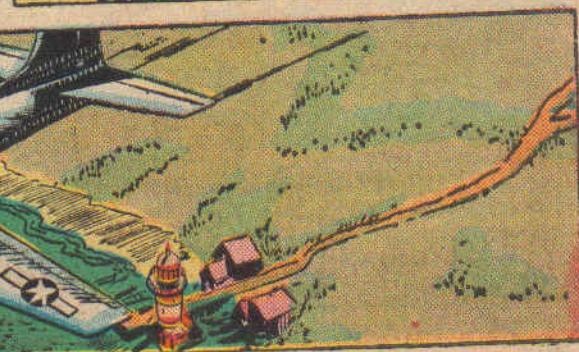
WHEN CAME OTHER TYPES--
FAST AND FURIOUS--THE
LOCKHEED 'SHOOTING STAR',
OR F-80, WITH AN IMPROVED
JET ENGINE. IT SET RECORD
AFTER RECORD... COAST TO
COAST IN 4½ HOURS... NEW
YORK TO SCHENECTADY IN
17 MINUTES."



"A NEW KIND OF PLANE WAS DEVELOPED FOR
THE NAVY...THE RYAN 'FR-1 FIREBALL'...A
JET ENGINE PLUS A CONVENTIONAL-TYPE,
WITH PROPELLER. DESIGNED AS A CARRIER-BASED
FIGHTER, THE FIREBALL HAS A TERRIFIC RATE
OF CLIMB."

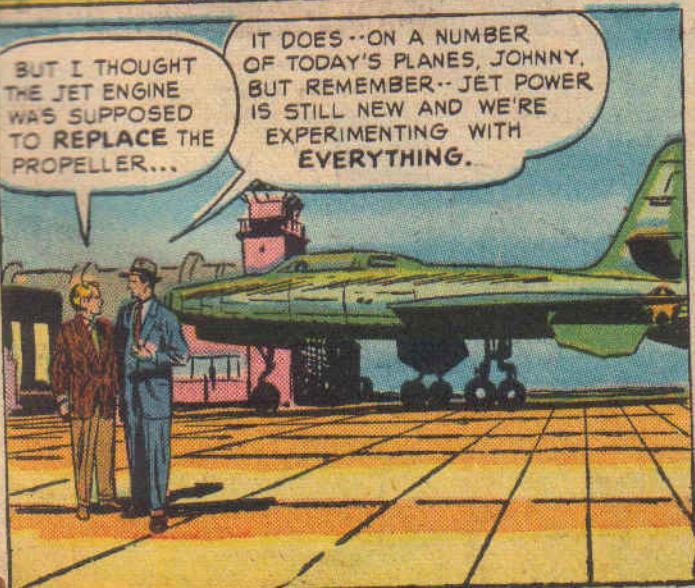


"THEN THE TURBO-
PROP--POWERING THE
XF-81...WITH THE
TURBINE NOT ONLY
OPERATING THE
COMPRESSOR, BUT
ALSO GEARED TO TURN
A CONVENTIONAL
PROPELLER."



BUT I THOUGHT
THE JET ENGINE
WAS SUPPOSED
TO REPLACE THE
PROPELLER...

IT DOES--ON A NUMBER
OF TODAY'S PLANES, JOHNNY.
BUT REMEMBER--JET POWER
IS STILL NEW AND WE'RE
EXPERIMENTING WITH
EVERYTHING.



WE'LL PROBABLY ALWAYS USE
PROPELLERS FOR CERTAIN
PURPOSES, BUT JETS WILL BE
USED MORE AND MORE AS
THEY'RE DEVELOPED AND
IMPROVED. FOR INSTANCE--



IN JUST THESE FEW SHORT YEARS SINCE THE FIRST SUCCESSFUL JET FLIGHT -- AS PRODUCTION INCREASED AND MORE EXPERIENCE WAS GAINED -- G. E. DEVELOPED THE TG-180 (THE J-35) TURBOJET ENGINE, WHICH IN 1947 --

"POWERED THE DOUGLAS D-558 'SKYSTREAK' -- THE NAVY'S SINGLE-JET HIGH-SPEED TEST-TUBE -- TO SET A SPEED RECORD OF 640 MILES AN HOUR!"



"THE J-35 ALSO POWERS NORTHROP'S MIGHTY B-49 -- THE 'FLYING WING' -- A TAILLESS, 100-TON, 8-TURBOJET GIANT. BECAUSE OF ITS RADICAL DESIGN, THE B-49 KNIFES ITS WAY THROUGH THE AIR WITH VERY LITTLE RESISTANCE."

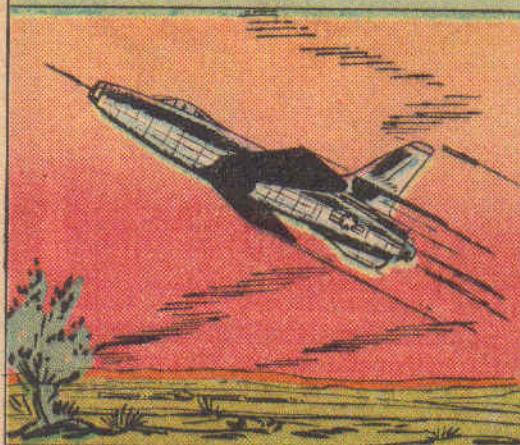
"AND IT WAS BOEING'S B-47 -- THE 'STRATOJET' -- THE WORLD'S FASTEST BOMBER -- WITH SWEPT-BACK WINGS, 6 G-E TURBOJETS (PLUS 18 ROCKET UNITS FOR FAST TAKE-OFF) -- THAT, IN 1949, SET A NON-STOP COAST-TO-COAST SPEED RECORD OF 3 HOURS, 46 MINUTES!"

IN THE MEANTIME, G. E. WAS WORKING ON AN EVEN GREATER JET POWERPLANT... AND IN 1948, PRODUCED THE TG-190 (J-47) -- 25% MORE POWER THAN THE J-35, WITHOUT ANY INCREASE IN SIZE!

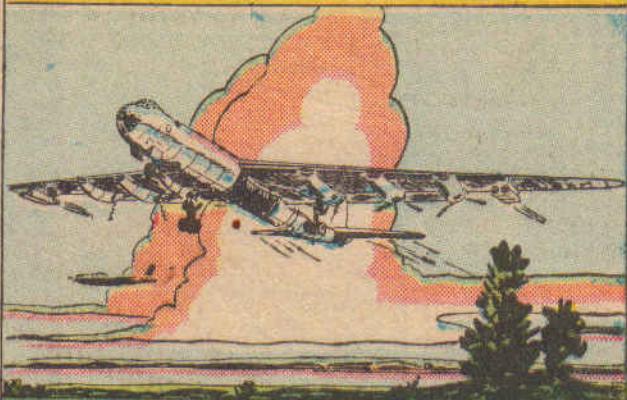
"THIS ENGINE ALSO POWERS NORTH AMERICAN'S B-45 -- THE 'TORNADO' -- THE FIRST OPERATIONAL JET BOMBER. IN THE 550-MILE-AN-HOUR CLASS, THE 'TORNADO' IS EQUIPPED WITH 4 TURBOJETS."

"IN THAT YEAR, THE J-47 POWERED NORTH AMERICAN'S F-86 -- THE 'SABRE' -- A SINGLE-JET FIGHTER -- TO A NEW WORLD'S SPEED RECORD OF 671 MILES AN HOUR!"

"AND REPUBLIC'S XF-91 (ONE J-47 PLUS ROCKETS) -- THE HIGH-ALTITUDE AIR FORCE PLANE, DESIGNED TO INTERCEPT HIGH-SPEED BOMBERS AND MISSILES."



"CONSOLIDATED VULTEE'S B-36D IS THE WORLD'S LARGEST AND LONGEST-RANGE BOMBER..."



"THE B-36D CARRIES 4 J-47'S SUSPENDED BENEATH THE WINGS, IN ADDITION TO THE 6 PISTON ENGINES."

1948
1947
1945
1944
1935
1932
1931
1919
1904
1903
YEAR



YES, WE'VE COME A LONG WAY SINCE THE WRIGHT BROTHERS, AND WITH JET ENGINES -- WE'RE GOING A LOT FURTHER.

HOWARD HUGHES - 352.388 M.P.H.
JIMMY DOOLITTLE - 294.28 M.P.H.
RUTH NICHOLS - 210.65 M.P.H.
ARMY PLANES FLEW 106 M.P.H.
WILBER WRIGHT FLEW 50 MILES AN HOUR
ORVILLE WRIGHT - 120 FEET IN 12 SECONDS

ROCKET PLANES
? M.P.H.

RAMJET - ? M.P.H.

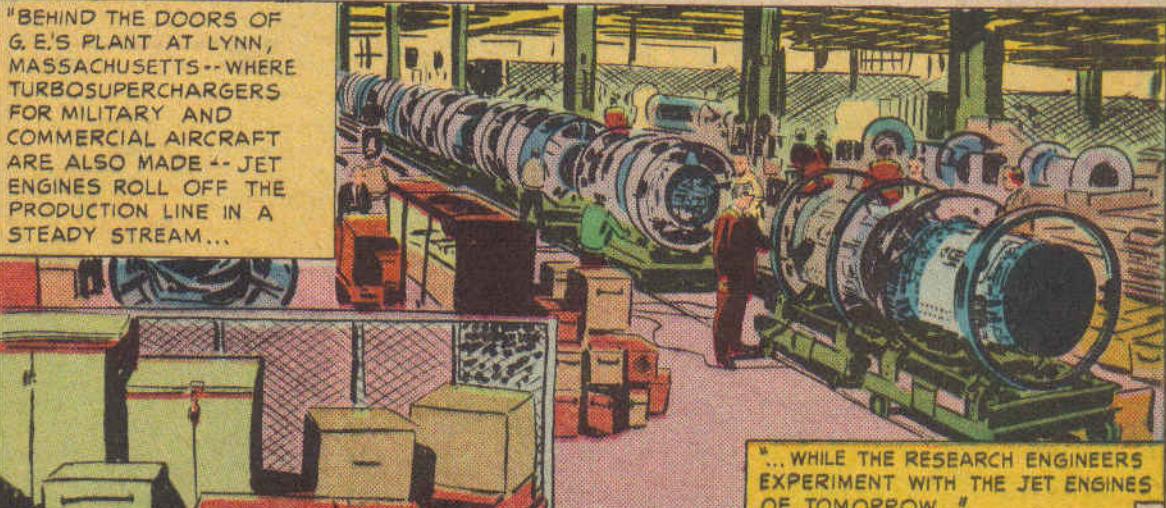
NORTH AMERICAN F-86 "SABRE" - 671 M.P.H.

DOUGLAS D-558 "SKYSTREAK" 640.7 M.P.H.

REPUBLIC F-84 "THUNDERJET" - 590 M.P.H.

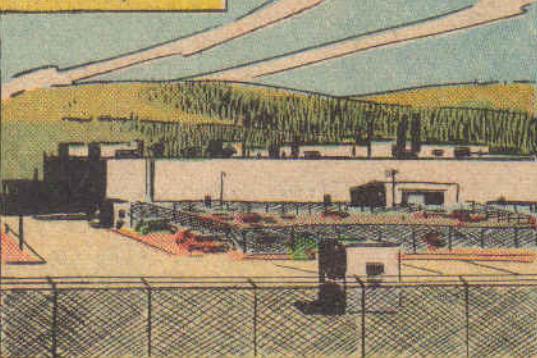
"YES, JOHNNY -- WE'RE
RIGHT ON THE THRESH-
OLD OF A WHOLE NEW
AGE OF FLIGHT..."

"BEHIND THE DOORS OF G. E.'S PLANT AT LYNN, MASSACHUSETTS -- WHERE TURBOSUPERCHARGERS FOR MILITARY AND COMMERCIAL AIRCRAFT ARE ALSO MADE -- JET ENGINES ROLL OFF THE PRODUCTION LINE IN A STEADY STREAM..."



"... WHILE THE RESEARCH ENGINEERS EXPERIMENT WITH THE JET ENGINES OF TOMORROW."

"TO MEET THE AVIATION INDUSTRY'S GREAT DEMAND FOR J-47'S, A NEW MANUFACTURING IDEA CAME INTO BEING -- G. E.'S PLANT AT LOCKLAND, OHIO



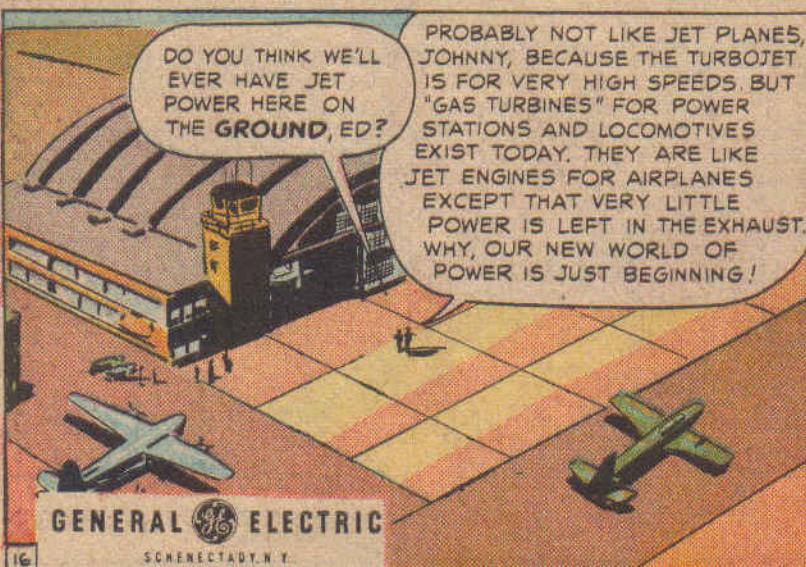
"MORE THAN 200 MANUFACTURERS FROM ALL OVER THE COUNTRY SHIP THE ENGINE PARTS TO LOCKLAND FOR ASSEMBLY AND TESTING!"

"THE FINAL TEST, OF COURSE, IS PERFORMANCE IN THE AIR.. THIS SLEEK B-29 ACTS AS A 'FLYING TEST BED' FOR NEW ENGINES, WHICH ARE SUSPENDED THROUGH THE BOMB-BAY DURING TRIAL FLIGHTS."



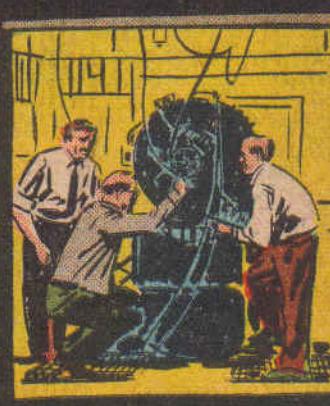
DO YOU THINK WE'LL EVER HAVE JET POWER HERE ON THE GROUND, ED?

PROBABLY NOT LIKE JET PLANES, JOHNNY, BECAUSE THE TURBOJET IS FOR VERY HIGH SPEEDS. BUT "GAS TURBINES" FOR POWER STATIONS AND LOCOMOTIVES EXIST TODAY. THEY ARE LIKE JET ENGINES FOR AIRPLANES EXCEPT THAT VERY LITTLE POWER IS LEFT IN THE EXHAUST. WHY, OUR NEW WORLD OF POWER IS JUST BEGINNING!



GENERAL ELECTRIC

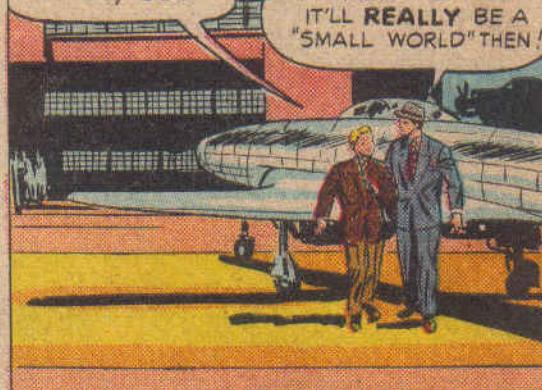
SCHEONECTADY, N.Y.



"BEHIND THE THICK WALLS OF THE TEST CELLS, THE POWERFUL TURBOJETS ARE TESTED--AND RE-TESTED--BY SKILLED TECHNICIANS WHO HAVE ONLY ONE STANDARD: PERFECT PERFORMANCE."

BOY, AT THE RATE WE'RE GOING, I GUESS IT WON'T BE LONG BEFORE AMERICA HAS JET-PROPELLED PASSENGER PLANES, TOO!

RIGHT, JOHNNY... COMMERCIAL AIR-LINERS WILL BE MAKING SOME OF THEIR TRIPS IN HALF THE TIME. IT'LL REALLY BE A "SMALL WORLD" THEN!



WOW! I HOPE I'LL SEE THAT "NEW WORLD OF POWER"! YOU WILL, JOHNNY... YOU WILL!

